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Description of the ghost shrimp *Sergio mericeae*, a new species from south Florida, with reexamination of *S. guassutinga* (Crustacea: Decapoda: Callianassidae)

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Abstract.—*Sergio mericeae* is here described from intertidal sandflats of the Atlantic coast of Florida, where it shares habitats with *Neocallichirus rathbunae* and *N. grandimana*. This new species, formerly identified with the Brazilian species, *Sergio guassutinga* (until recently assigned to *Neocallichirus*), bears a strong resemblance to its Brazilian counterpart in body size, the unique dactylar dentition of the major chela, and most other morphological features. However, these apparent sibling species can be distinguished on the basis of body coloration and subtle but consistent differences in the third maxilliped and major cheliped. Immature specimens from Louisiana, Texas and Tamaulipas, Mexico, strongly resemble topotypic juveniles from Fort Pierce, Florida, and suggest that *S. mericeae* ranges into the western Gulf of Mexico.

Uniqueness of the species described below was recognized in the course of our ongoing effort to document diversity of infaunal decapods inhabiting intertidal substrates of the Indian River Lagoon on the Atlantic coast of Florida. Our collecting efforts in this region of marked tropical to warm-temperate faunal transitions have employed yabby pumps (Hailstone & Stephenson 1961, Manning 1975) for extraction of a speciose assemblage of thalassinid ghost shrimp and associated fossorial forms. Materials from this region have led to comparative studies of thalassinids from throughout the western Atlantic, as well as systematic revisions and new distribution records, especially for members of the Callianassidae (Felder & Manning 1994; Manning 1987, 1993; Manning & Felder 1986, 1991, 1992; Manning & Heard 1986; Manning & Lemaitre 1994; Rodrigues & Manning 1992). Collection of new materials from Florida was essential in order for us to reexamine the populations previously reported on by Biffar (1971), as many specimens upon which his earlier records were based were lost in a laboratory fire just prior to publication of his work.

Recent studies of the American Callianassidae have revealed a number of cases where species formerly thought to be of wide distribution were actually complexes comprised of regionally endemized species (Felder et al. 1991, Felder & Manning 1994, Felder & Rodrigues 1993, Manning 1993). In the context of those patterns, the previous report of the Brazilian *Callianassa guassutinga* Rodrigues from south Florida (Biffar 1971) suggested such an extensive range that we were led to question the conspecific assignment of its northern and southern populations. As materials that Biffar assigned to this species from Florida were for the most part destroyed in the aforementioned fire (see Biffar 1971), detailed comparisons with the Brazilian form were delayed until we could accumulate an adequate series of adult specimens from the

Florida population. In the course of making those collections, we photographically documented coloration in northern populations which differed markedly from reported coloration of the Brazilian species (Rodrigues 1966, 1971), and this further encouraged us to undertake detailed morphological studies and the present description of a new species.

Material examined is listed by location followed by date, collector (coll), number of specimens per sex and condition (mutl = mutilated, ov = ovigerous, immat = immature), and museum number. Size is expressed as postorbital carapace length (cl) or total length (tl) measured in millimeters (mm). The holotype and some paratypes of *Sergio mericeae* have been deposited in the National Museum of Natural History (USNM), Smithsonian Institution, Washington, DC. Paratypes have been deposited in the University of Southwestern Louisiana Zoological Collections (USLZ), Lafayette, Louisiana, the Harbor Branch Oceanographic Museum (HBOM; formerly the Indian River Coastal Zone Museum, (IRCZM), Fort Pierce, Florida, and the Florida Marine Research Institute Invertebrate Collection (FSBC-I), St. Petersburg, Florida. Comparisons with the Brazilian species *Sergio guassutinga* were based upon the published figures and descriptions by Rodrigues (1966, 1971) and examination of a mature female from Aracaju, Brazil (USNM 268644), herein illustrated, as well as comparisons with a female topotype (USNM 221802), a male paratype (USNM 256886), a male from Praia de Pirangi-Sul, Rio Grande do Norte, Brazil (USNM 221810), and a female specimen from Natal, Rio Grande do Norte, Brazil (USNM 221804).

Sergio Manning & Lemaitre, 1994
Sergio mericeae, new species
Figs. 1a–f, 2a–f, 3a–f, 4a–f, 5a–g

Callianassa guassutinga.—Biffar, 1971: 651, 653, 674, figs. 9, 10 [Virgina Key, Miami, Florida. Not *Callianassa guassutinga* Rodrigues, 1966, 1971].—Abele & Kim, 1986: vii, 26, 294, 296, 298, figs. a–c on 299.—Williams et al., 1989: 28, 61.

"near *Callianassa guassutinga*".—Manning & Felder, 1989: 16.

Callianassa (nr. *C. guassutinga*).—Rabalais et al., 1989: 35.

Sergio sp.—Staton & Felder, 1995: 505.

Sergio guassutinga.—Manning & Lemaitre, 1994: 40 [Florida record only. Not listed and figured Brazilian materials].

Type material.—*Holotype*: North side of Fort Pierce Inlet, Florida, island immediately west of Coon Island, St. Lucie County, Indian River Lagoon, intertidal sandflat just shoreward of sparse seagrass, 27°28.2′N, 80°18.8′W, 20 May 1994, coll D. L. Felder and W. D. Lee, 1 ♂ (cl 29.8 mm), USNM 268645.

Paratypes: Same site as holotype, 6 Mar 1985, coll W. D. Lee and S. Petry, 1 ♂ (cl 28.3 mm; tl 106 mm), USNM 268682; 5 Mar 1985, coll W. D. Lee and S. Petry, 1 mutl ♂ (cl ca 30 mm), USNM 268683; no date, coll W. D. Lee and S. Petry, 1 ♀ (cl 31.1 mm; tl 115 mm), USNM 268684; north side of Fort Pierce Inlet, Florida, Dynamite Point site near Fort Pierce Inlet State Park, St. Lucie County, Indian River Lagoon, 27°28.3′N, 80°17.8′W, 12 Aug 1989 (RBM station FP 89-5), coll D. L. Felder and R. Brown, 1 ♂ (cl 20.4 mm), USNM 268685; 3 Jun 1993, coll D. L. Felder, 1 ♀ (cl 10.7 mm; tl 35.8 mm), USLZ 3542; north side of Fort Pierce Inlet, Florida, Coon Island, St. Lucie County, Indian River Lagoon, 27°28.2′N, 80°18.2′W, 3 Apr 1985, coll W. D. Lee and S. Petry, 1 ♂ (cl 31.1 mm; tl 115.2 mm), USNM 268686; 16 Jul 1994, coll W. D. Lee, 1 ♀ (cl 27.1 mm; tl 105.6 mm), USLZ 3543; north side of Fort Pierce Inlet, Florida, northeast of Coast Guard Station, near exposed sand bar, 0.3 m depth, 25 Apr 1972, coll H. B. Russell, 1 ♂ (cl 29.7 mm; tl 118 mm), HBOM 89:103; south side of Fort Pierce Inlet, Florida, intertidal sand bar just north of and separated by shallow channel from U.S. Highway A1A causeway

between Fort Pierce and South Hutchinson Island, St. Lucie County, Indian River Lagoon, 27°27.7′N, 80°18.7′W, 23 Jul 1985 (RBM station FP 85-4), coll R. B. Manning and D. L. Felder, 1 mutl ♀ (cl ca. 29 mm), USNM 268687; 12 Aug 1986 (RBM station FP 86-4), coll R. B. Manning, D. L. Felder, and W. D. Lee, 1 mutl ♂, USNM 268688; 15 Aug 1986 (RBM station FP 86-7), coll R. B. Manning, D. L. Felder, and W. D. Lee, 1 mutl ♂ (cl 13.7 mm), 2 ov ♀♀ (1 mutl, other cl 30.5 mm; tl 114.9 mm), USNM 268689; 2 Mar 1987 (RBM station FP 87-2), coll R. B. Manning and W. D. Lee, 2 ♂♂ male (cl 9.1, 9.4 mm), USNM 268690; 3 Mar 1987 (RBM station FP 87-4), coll R. B. Manning and W. D. Lee, 1 mutl ♀, USNM 268691; 5 Mar 1987 (RBM station FP 87-6), coll R. B. Manning and W. D. Lee, 2 ♂♂ (cl 10.4, 17.5 mm), USNM 268692; 17 Apr 1988 (RBM station FP 88-1), coll R. B. Manning and M. Schotte, 1 mutl ♂ (cl ca. 15 mm), USNM 268693; 1 Jun 1993, coll D. L. Felder, 1 ♀ (cl 26.5 mm, dissected for hindgut study), USLZ 3544; 2 Jun 1993, coll D. L. Felder, 1 ♂ (cl 12.3 mm, dissected for hindgut study), USLZ 3545; 6 Aug 1993, coll D. L. Felder and J. M. Felder, 1 ♀ (cl 14.0 mm), USLZ 3546; St. Lucie, Florida, intertidal unvegetated sand flat just inside St. Lucie Inlet, Martin County, Indian River Lagoon, 27°10.5′N, 80°10.4′W, 11 Feb 1983 (RBM station FP 83-2), coll R. B. Manning, W. D. Lee, and H. Schiff, 3 ♂♂ (cl 8.3, 9.2, 10.2 mm), USNM 268694; Lake Worth Inlet, Florida, intertidal, sparsely vegetated, sandy to shelly-sand flats on north side of Peanut Island, Palm Beach County, 26°46.7′N, 80°2.9′W, 4 Mar 1987 (RBM station FP 87-5), coll R. B. Manning and W. D. Lee, 3 ♀♀ (cl 10.6, 18.7, 30.0 mm), USNM 268695; 10 Aug 1987 (RBM station 87-8), coll D. L. Felder, W. D. Lee, P. Mikkelsen, and R. Bieler, 1 ♂ (cl 12.5 mm), USNM 268696; 11 Aug 1987 (RBM station 87-9), coll D. L. Felder and W. D. Lee, 2 ♂♂ (1 mutl, other cl 27.2 mm), USNM 268697; 12 Aug 1987 (RBM station 87-10), coll D. L. Felder, W. D. Lee, and P. Mikkelsen, 1 ♂ (cl 17.0 mm), USNM 268698; 1 ♂ (cl 14.5 mm, photographic voucher), USLZ 3547, 2 ♂♂ (cl 13.4, 13.8 mm), 2 mutl ov ♀♀, FSBC-I 47980; 8 Sep 1985, coll W. Lee and P. Mikkelsen, 1 ♂ (cl 16.0 mm), USNM 268699; 23 July 1994, coll D. L. Felder, J. M. Felder, R. D. Felder, and W. D. Lee, 2 ♀♀ (cl 11.9, 18.5 mm), USLZ 3548; Seaquarium Flats, Virginia Key, Dade County, Florida, 29 Feb 1964, coll S. Dobkin, 1 ♀ (cl 10.3 mm; tl 37.4 mm), USNM 122732.

Other material examined.—Louisiana: Just off Cat Island Pass, mouth of Terrebonne Bay, 28°56.8′N, 90°33.7′W, trawl, depth of 12–13 m, 12 Jul 1984, coll N. N. Rabalais and students, 5 mutl immat (cl 6.5–7.9 mm), USLZ 3549. Texas: Port Isabel, Texas, lower Laguna Madre near Brazos Santiago inlet, muddy sand flat just north of mainland end of old abandoned causeway to South Padre Island, Cameron County, Jul 1991, coll D. L. Felder, J. M. Felder and R. D. Felder, 1 mutl ♀ (cl 10.4 mm), USLZ 3550. Mexico: Barra del Tordo, Tamaulipas, Mexico, depth ca. 0.3 m, margins of sandy *Halodule* flat just inside inlet at mouth of Rio Carrizal estuary, 24 May 1982, coll D. L. Felder and R. K. Tinnin, 5 ♂♂ (cl 9.5, 9.7, 9.9, 10.6, 12.0 mm), 3 ♀♀ (cl 9.5, 10.6, 10.8), USLZ 3551 (two are photographic vouchers).

Diagnosis.—Front of carapace with three small spinous anterior projections, usually subequal or with medial slightly longer than laterals. Eyestalks broad, tapered over length, usually terminated in spine, tubercle or acute angle, often not reaching to distal end of first antennular segment. Third maxilliped with dactyl arched and propodus broad, height of propodus greater than length of dactyl; diagonal length of merus-ischium less than or equal to 2 times width at joint between these articles. Major cheliped of adults with inferior margin of merus armed proximally by elongate process of 2–3 fused spines, beyond which is short gap in mar-

ginal dentition, lateral surface with low, rounded longitudinal carina; carpus about half as long as palm; dactylus shorter than palm, cutting edge with rectangular tooth proximally, acute recurved tooth at midlength, and series of smaller acute teeth distally. Minor cheliped with dactylus usually longer than palm. Uropodal exopod with dorsal plate much shorter than ventral plate. Telson with posterior margin weakly emarginate.

Description.—Adults of relatively large size, with postorbital carapace lengths sometimes >30 mm and total lengths occasionally >110 mm.

Frontal margin of carapace (Figs. 1a, 5a, b) with three anterior prominences, each acute or terminated by short spine, median of which is slightly more produced on triangular base to form rostrum, lateral of which overlie inner margins of antennal peduncles; low, obtuse tooth on anterolateral margin just lateral to outer margin of antennal peduncle. Rostrum extending less than ⅓ visible length of eyestalks in dorsal view. Carapace lacking rostral carina, with distinct linea thalassinica, and with a defined dorsal oval marked posteriorly by deep transverse cardiac furrow, furrow extending anteroventrally to either side above linea thalassinica as shallow sinuous groove demarcating posterior half of dorsal oval. Shallow cervical groove originating immediately below linea thalassinica on anterior half of branchiostegite and curved anteroventrally, intersecting raised sinuous ridge in anterior third of branchiostegite; portion of ridge anterior to intersection positioned ventrolaterally to rounded hepatic boss and usually sculpted by weak crenelations on upper surface. Subantennular region of epistome with dense tuft of long setae bracketing those of antennular peduncle.

Eyestalks flattened, weakly concave dorsally, length equal to or slightly less than 2 times basal width, in dorsal view tips reaching to or nearly to distal end of basal antennal article; mesial surfaces of eyestalks closely opposed over proximal portion of midline, divergent terminally; weakly sinuous anterolateral margin arching from broad base of eyestalk to anterior taper, joining mesial margin anteriorly in variable terminus, ending as spinule, tubercle or acute corner; rarely with subterminal spinule or tubercle in addition to terminal one. Cornea dark, area of pigmentation sexually dimorphic; in both sexes, rounded corneal surface is small, subterminal, anterolateral in position, larger relative to eyestalk and more bulbous in immature than in adult animals; in adult males, pigmented area large, often diffuse, almost broad as stalk, often occupying much of distal third to ⅔ of eyestalk; in adult females and juveniles, pigmented area smaller, more restricted to area of rounded corneal surface.

Antennular peduncle shorter and heavier than antennal peduncle, terminal article slightly longer than penultimate and reaching to or beyond midlength of terminal article on antennal peduncle; penultimate and terminal articles of peduncle with ventromesial and ventrolateral rows of long setae, those of ventrolateral row longer, denser, and continued onto ventral ramus of flagellum; rami of flagellum subequal in length, 4–5 times length of terminal article of peduncle; dorsal ramus with sparse tufts of long setae, distal half with heavier articles bearing dense tufts of short ventral setae, articles comprising tapered tip with dense line of short ventral aesthetascs. Antennal peduncle with penultimate article subequal to or slightly longer than terminal article; basal article with dorsolateral carina above laterally produced excretory pore; second article with deep, diagonal ventral suture, distolaterally with single tuft of setae, small rounded vestige of dorsal scale articulated at joint with third article; third article elongate, narrower than second, slightly longer than combined lengths of first two, proximolaterally with partially fused condylar process articulated to distolateral extreme of second article; fourth article narrower than

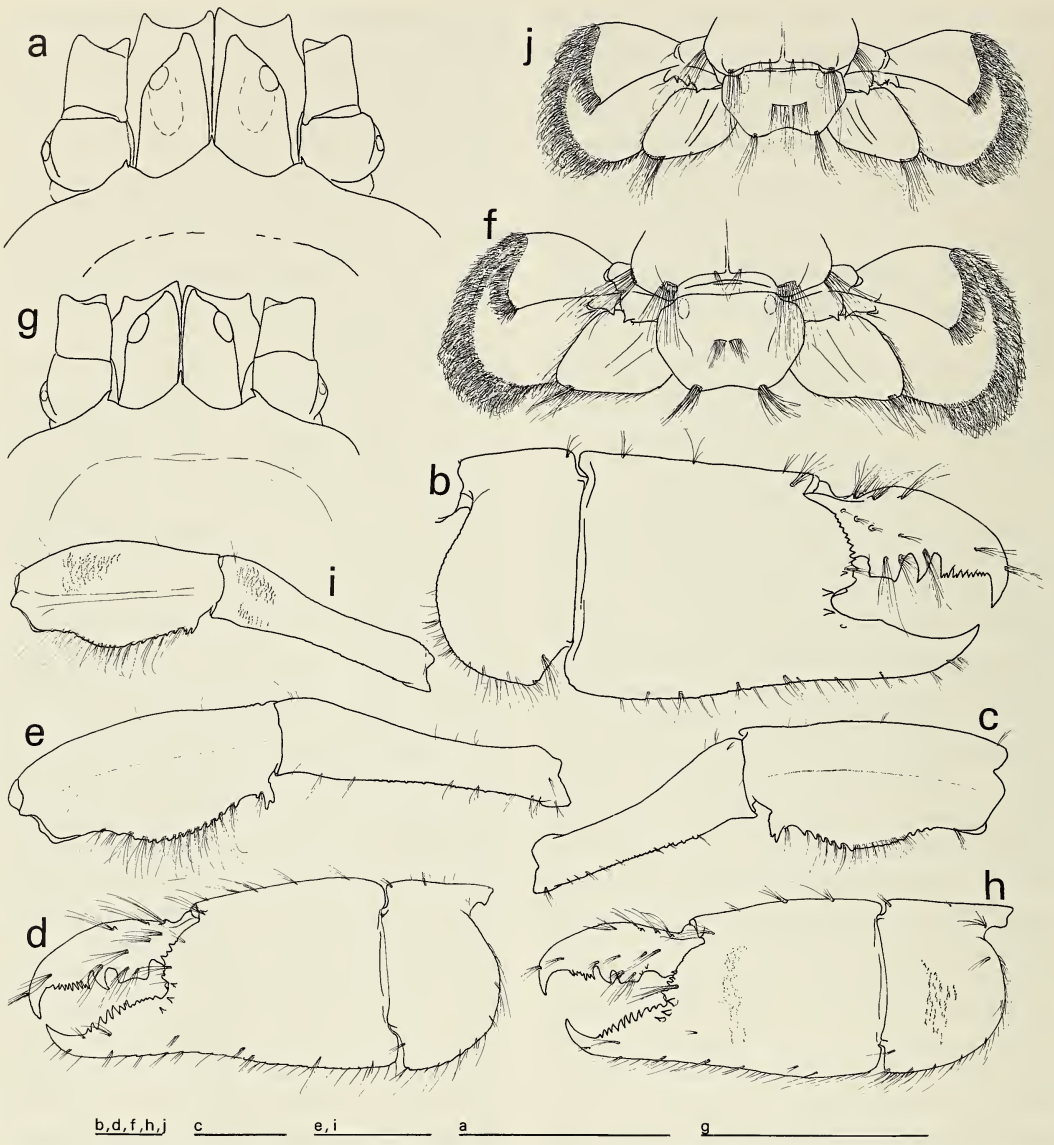

Fig. 1. *Sergio mericeae,* new species, type materials from Fort Pierce Inlet, Florida; a–c, f, male holotype (cl 29.8 mm), USNM 268645; d, e, female paratype (cl 26.5 mm), USLZ 3544. a, Carapace front, eyestalks, basal antennal segments, dorsal view, setae not shown; b, Major cheliped of mature male, carpus and chela, external surface; c, Major cheliped of mature male, ischium and merus, external surface; d, Major cheliped of mature female, carpus and chela, external surface; e, Major cheliped of mature female, ischium and merus, external surface; f, Telson, uropods and part of sixth abdominal segment, dorsal view. *Sergio guassutinga* (Rodrigues) from Aracaju, Brazil, female (cl 23.5 mm), USNM 268644; g, Carapace front, eyestalks, basal antennal segments, dorsal view, setae not shown; h, Major cheliped of mature female, carpus and chela, external surface; i, Major cheliped of mature female, ischium and merus, external surface; j, Telson, uropods and part of sixth abdominal segment, dorsal view. Scale lines indicate 5 mm.

third; flagellum 2–2.5 times length of antennular flagellum.

Mandibles (Fig. 2a) with large, 3-segmented palp, elongated third article of palp slightly tapered and terminally rounded, long setae on external and distal surfaces of second article and on proximal extensor surface of third, field of short setae on most of extensor surface and terminal end of third article; incisor process with well-defined, terminally corneous teeth on cutting margin, teeth largest, less coalesced on proximal two thirds of cutting margin, internal surface with lip giving rise to molar process proximal to incisor teeth, molar process with 4–6 small marginal teeth; paragnath (not figured) rounded, scaliform, poorly sclerotized, set against and below molar process. First maxilla (Fig. 2b) with endopodal palp long, narrow, terminal article deflected proximally at articulation; proximal endite densely setose on sinuous margin, terminal lobe additionally with field of large, terminally bifurcate setae; distal endite elongate, proximally narrow, broadening terminally where armed with short stiff bristles and field of short setae, some with bifurcate tips; exopodite low, truncate and setose. Second maxilla (Fig. 2c) with endopod narrowed distally, first and second endites each longitudinally subdivided, internal surface of first endite fused to broad, rounded, marginally setose plate; exopod forming large, broad, scaphognathite. First maxilliped (Fig. 2d) with proximal endite narrowly produced, dentiform, marginally setose; distal endite robust, subquadrate, mesial half of external surface and margins heavily setose, longest setae terminal, internal surface concave; exopod ovoid, divided by transverse suture marking notch on mesial margin, longest setae in field on external surface and mesial margin proximal to notch; epipod large, broad, anterior end tapered to narrow terminus. Second maxilliped (Fig. 2e) with long, narrow endopod; endopodal merus length exceeding 4 times width, flexor margin with dense fringe of long, close-set setae; carpus short; propodus slightly arcuate, heaviest distally, length almost 3 times width; dactylus short, about ⅓ length of propodus, with terminal brush of stiff bristles; exopod phylloform, nearly as long as endopodal merus, marginally fringed by long setae; epipod small, sutures subdividing into 2 proximal lobes and minute trianguliform terminal lobe. Third maxilliped (Figs. 2f, 3a) without exopod; endopod with long, dense setation on mesial margin, terminal 3 articles also with long setation on extensor margins; length of endopodal merus-ischium about 2 times width; ischium subquadrate, slightly longer than broad, diagonal length in adults about 1.6 times width at suture with merus, proximomesial margin forming subacute corner, internal surface with poorly defined, longitudinally oriented elevation bearing curved row of small denticles; merus subtriangular, distinctly broader than long; carpus heavy and subtriangular, with setose lobe on flexor margin, internal surface with dense field of fine setae in distal third; propodus large, subquadrate in adults, height often exceeding length, internal surface with narrow median field of fine, dense setae, opposable margin slightly emarginate; dactylus narrow, arcuate, in adults distinctly shorter than height of propodus, terminally with small brush of stiff bristles.

Branchial formula includes exopods and epipods as described for first and second maxillipeds above; branchiae limited to single rudimentary arthrobranch on second maxilliped, pair of arthrobranchs on third maxilliped, and pair of arthrobranchs on each of the first through fourth pereopods.

First pereopods of two sides forming dissimilar chelipeds, major cheliped heavy, massive in adults of both sexes (Fig. 1b–e), much less altered from minor cheliped in juveniles than in adults (Fig. 5c–f). Major cheliped of adults strongly calcified; ischium slender, superior margin weakly sinuous, inferior (flexor) margin with row of minute denticles; merus about twice as long

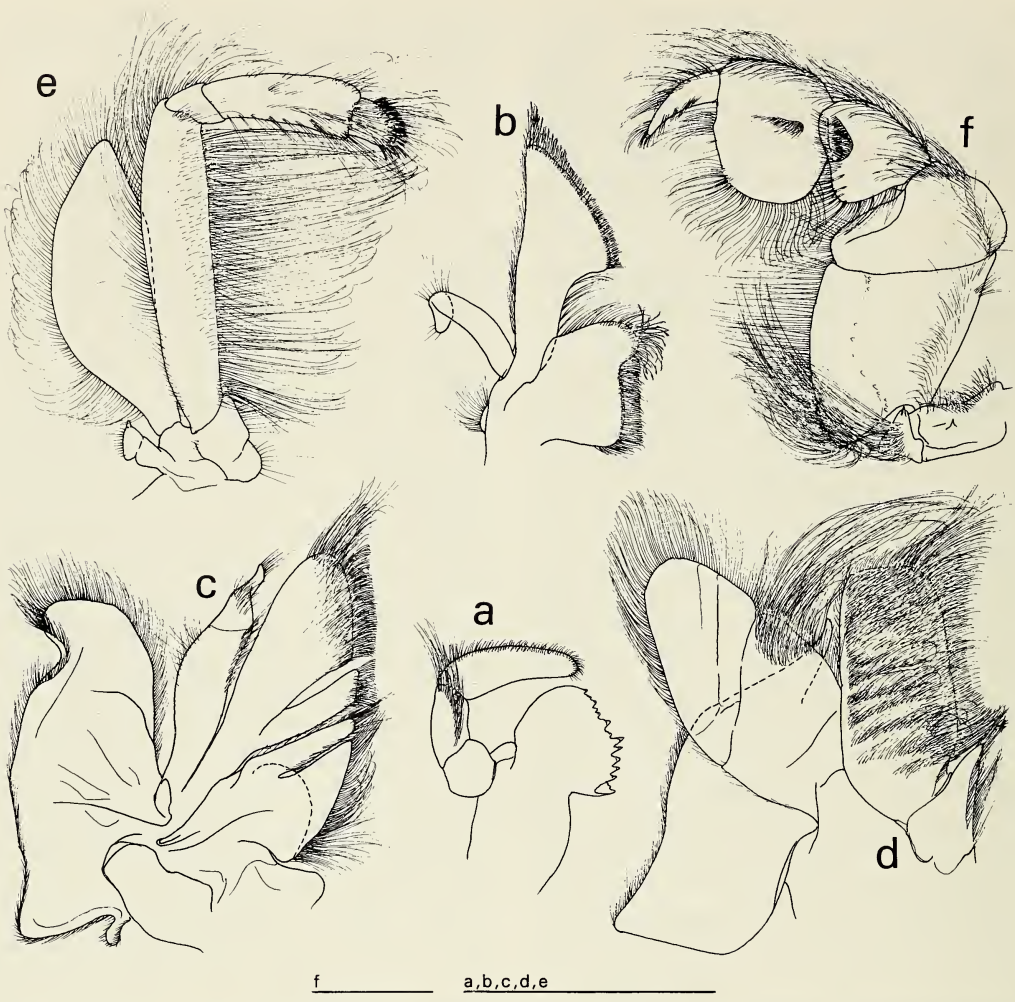

Fig. 2. *Sergio mericeae,* new species, type materials from Fort Pierce Inlet, Florida; a–e, female paratype (cl 26.5 mm), USLZ 3544; f, male holotype (cl 29.8 mm), USNM 268645, right mouthparts. a, Right mandible, external surface; b, First maxilla, external surface; c, Second maxilla, external surface; d, First maxilliped, external surface; e, Second maxilliped, external surface, rudimentary arthrobranch not shown; f, Third maxilliped, internal surface. Scale lines indicate 5 mm.

as high, superior margin weakly sinuous, sometimes with few minute tubercles proximally, inferior margin more strongly arcuate, proximally with strong projecting often bifurcate process of 2–3 fused spines, margin distal to process with short unarmed region beyond which margin is lined by small inferodistally directed teeth; carpus broad, relatively shorter and higher in adults than in immature specimens, in large adults length about $^{6}/_{10}$ of height, superior margin nearly straight, forming thin unserrated keel slightly overhanging internal surface, proximoinferior margin regularly rounded in outline, serrations of keel most evident on internal surface; propodus heavy, length (including fixed finger) in large adults about 1.7 times height, height greatest basally, superior margin of palm forming unserrated keel, especially in proximal half, inferior

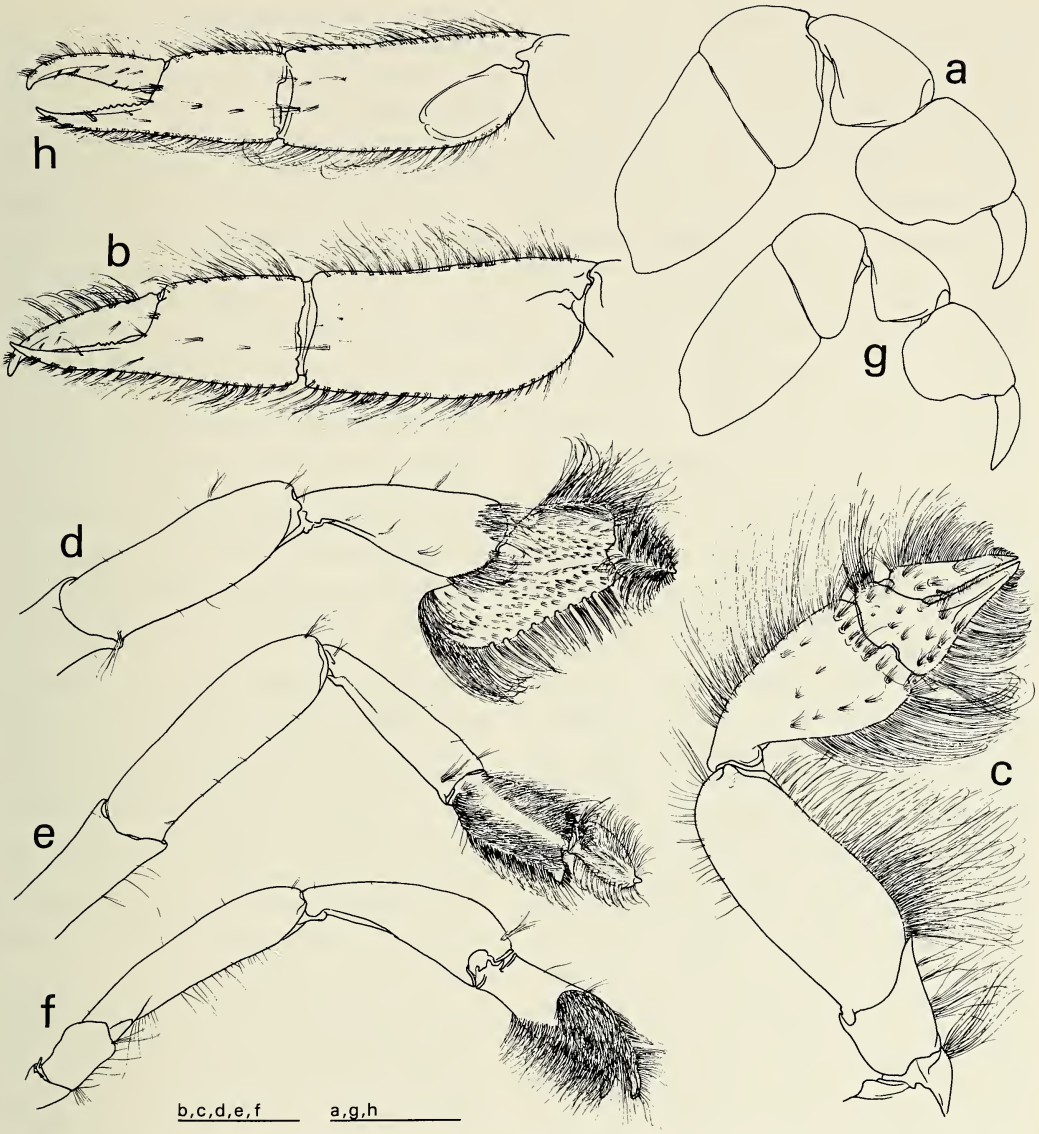

Fig. 3. *Sergio mericeae,* new species, type materials from Fort Pierce Inlet, Florida; a, b, female paratype (cl 26.5 mm), USLZ 3544; c–f, male holotype (cl 29.8 mm) USNM 268645. a, Right third maxilliped, external surface, setae not shown; b, Minor cheliped, internal surface; c, Right second pereopod, external surface; d, Right third pereopod, external surface; e, Right fourth pereopod, external surface; f, Right fifth pereopod, external surface. *Sergio guassutinga* (Rodrigues) from Aracaju, Brazil, female (cl 23.5 mm), USNM 268644: g, Right third maxilliped, external surface, setae not shown; h, Minor cheliped, internal surface. Scale lines indicate 5 mm.

surface with serrated keel most developed proximally, usually with 2–3 sharp short spines or teeth on external surface just proximal to gape; fixed finger in adults with prehensile margin ranging from strongly serrate to unarmed; dactylus (movable finger) subequal in length to palm, prehensile margin at midlength with large, hooked acute tooth bearing a single setose punctum at its base, separated proximally by deep emargination

from a single heavy, quadrate basal tooth, and distally by another deep emargination from serrate margin on distal third of finger, finger terminated in acute, hooked tip.

Minor cheliped (Fig. 3b) slender, elongate in adults; ischium narrow, unarmed; merus elongately ovoid, length subequal to or slightly less than 2 times height, subequal to length of ischium; carpus rectangular, slightly longer than merus, length twice height, smooth; chela about as long as carpus; palm subrectangular, length slightly exceeding height; fixed finger subequal in length to palm, prehensile margin weakly serrate; dactylus (movable finger) in adults consistently exceeding length of palm, prehensile margin very weakly serrate.

Second pereopod (Fig. 3c) chelate, patches of long setae on inferior margin of ischium, most of flexor margin on merus and both margins of carpus lined with evenly spaced long setae, inferior margin of propodus with similar long setae proximally, progressively more reduced in length and stiffened distally, subterminally becoming dense patch of short, stiff bristles; prehensile margins of both fingers corneous, finely and uniformly microserrate along straight edge over most of length in both, microserration terminated distally in thickened corneous tips of fingers; superior margin of dactylus slightly sinuous, with long marginal setation becoming increasingly shorter length distally, replaced by dense patch of short stiff bristles subterminally; external surface of carpus, propodus and dactylus with scattered patches of short setae.

Third pereopod (Fig. 3d) merus length about 3 times width; carpus broadest distally, terminally with large patches of long setae overreaching propodus; propodus with strong proximally directed lobe on inferior margin, lobe terminally with long distally directed setae giving way to subdivided tufts of slightly shorter setae along inferodistal margin, superior margin with field of long setae, patterned tufts of lighter setae on outer face of article; dactylus tear-shaped, terminated in slightly cornified tip hooked toward external side, external surface densely setose, setae arranged in transverse bands on superior half.

Fourth pereopod (Fig. 3e) subchelate, inferodistal corner of propodus produced to form short fixed finger; soft dense setation on outer surface of propodus and dactylus, that of propodus divided into upper and lower fields, setae slightly longer in lower field which continues onto lower half of internal surface; dactyl terminated in narrow tip hooked toward external side.

Fifth pereopod (Fig. 3f) minutely chelate, opposable surfaces of propodus and minute dactylus excavate, spooned, terminally rounded, forming beak-like chela obscured by dense fields of setation on distal ½ of propodus and superior surface of dactylus; corneous prehensile lip of propodus pectinate.

Anterior abdominal somites smooth dorsally, surface sculpture of third through fifth tergites progressively more pitted, eroded, or undulated in appearance; second tergite with tuft of long setae on posterolateral lobe; third through fifth tergites each with a small broadly transverse field of very soft dense setae on the lateral lobe; sixth with distinct transverse, terminal, posteriorly facing groove above telson.

First pleopod of male and female uniramous, composed of 2 articles; in male (Fig. 4a), distal article subequal in length to or slightly shorter than proximal, subdivided into 2 lobes by weak longitudinal furrow, in mature male anterior lobe terminally rounded, posterior lobe terminally acute with tip directed anteroventrally; in female (Fig. 4b) proximal article subequal in length to terminal article, terminal article with weakly produced shoulder just beyond midlength. Second pleopod of male and female biramous; in male (Fig. 4c), dense setation largely restricted to tufts on lateral margin of exopod, distal extreme of exopod, lateral margin of endopod and appendix masculina, appendix masculina weakly separated

from and not overreaching end of distal lobe of endopod, no evidence of appendix interna; in female (Fig. 4d, e), both rami with long setae, appendix interna small and acutely tapered distally. Third to fifth pleopod pairs (Fig. 4f) forming large, posteriorly cupped fans when coupled at mesial margins of endopods; endopod of each subtriangular, appendix interna embedded into mesial margin of endopod.

Telson (Figs. 1f, 5g) broader than long, subhexagonal, broadest at lateral lobes at midlength or in anterior half, posterior emargination producing pair of weak lobes or obtuse posterolateral corners, each terminated by a tuft of long setae; dorsal surface with low, lightly setose boss near each anterolateral corner, medially with subdivided short transverse carina bordered posteriorly by line of setae. Uropod with acute, posterolaterally directed spine on protopod, spine overreaching anterolateral margin of endopod; endopod broad, trapezoidal, slightly longer than broad, dorsal surface with tuft of long setae near posterolateral corner, setae of posterior margin longest posterolaterally; exopod with anterodorsal plate falling well short of distal exopod margin, distal edge of plate lined with short, thick spiniform setae grading to thinner longer setae of exopod margin and long stiff, spiniform setae at posterodistal corner of plate, distal margin of exopod with dense fringe of setation, fringe diminished and replaced by row of short spiniform setae on posterior margin.

Size.—Among the materials examined, the largest male (cl 31.1 mm; tl 115 mm) and largest female (cl 30.7 mm; tl 115 mm; ovigerous) were both taken from the immediate vicinity of Fort Pierce Inlet, Florida. Eggs on ovigerous specimens are small with sizes (max. diameter) after preservation ranging from 0.58–0.62 mm for immature eggs without developed eyespots to 0.62–0.68 mm for more mature eggs with well developed eyespots.

Color (from notes and color photographs of live specimens).—Variable and fading quickly to opaque white in alcohol. In life most adult specimens with violet pink to rose pink ground color, occasionally very pale; usually with darker pink to scarlet or orange-red on the chelae, cardiac region of carapace, dorsal tergites of abdominal segments 1–2, mid-dorsal and posterior extremes of abdominal tergites 3–5, telson and uropods. Sixth abdominal tergite usually with 2 faint, reddish longitudinal bands to either side of midline in anterior ⅔. Juveniles often with striking scarlet red to rosy red coloration almost overall, but also with pigment deepest in same body areas as indicated for adults above.

Known range and habitat.—Known from intertidal to shallow subtidal in the Indian River Lagoon and along the lower Atlantic coast of Florida, USA, and (on the basis of juveniles only) from coastal Gulf of Mexico localities in Louisiana, south Texas, and Tamaulipas, Mexico. The single immature specimen of *Sergio* collected from Mayaguez, Puerto Rico, in 1934 (coll: V. Biaggi, Jr., tl 73 mm, USNM 77462) which was previously reported as *S. guassutinga* by Biffar (1971) may or may not be correctly assigned to that species, but we must defer this determination until additional, fully mature and better preserved materials of that southerly population become available.

While most specimens have been taken with yabby pumps from intertidal to shallow subtidal substrates, specimens from off Louisiana were taken in a trawl deployed at a depth of approximately 12–13 m. In virtually all cases, the animals appear to be distributed within or near inlets to the open ocean. In inlets of the Indian River Lagoon, where they burrow alongside *Neocallichirus rathbunae,* they typically occupy less vegetated areas of sandbars, often just shoreward of where larger mounds of ejecta mark the burrows of *N. rathbunae.* At least in shallow waters, adults of *Sergio mericeae* appear to have mud-lined burrows with surface openings 6–10 mm in diameter, and may or may

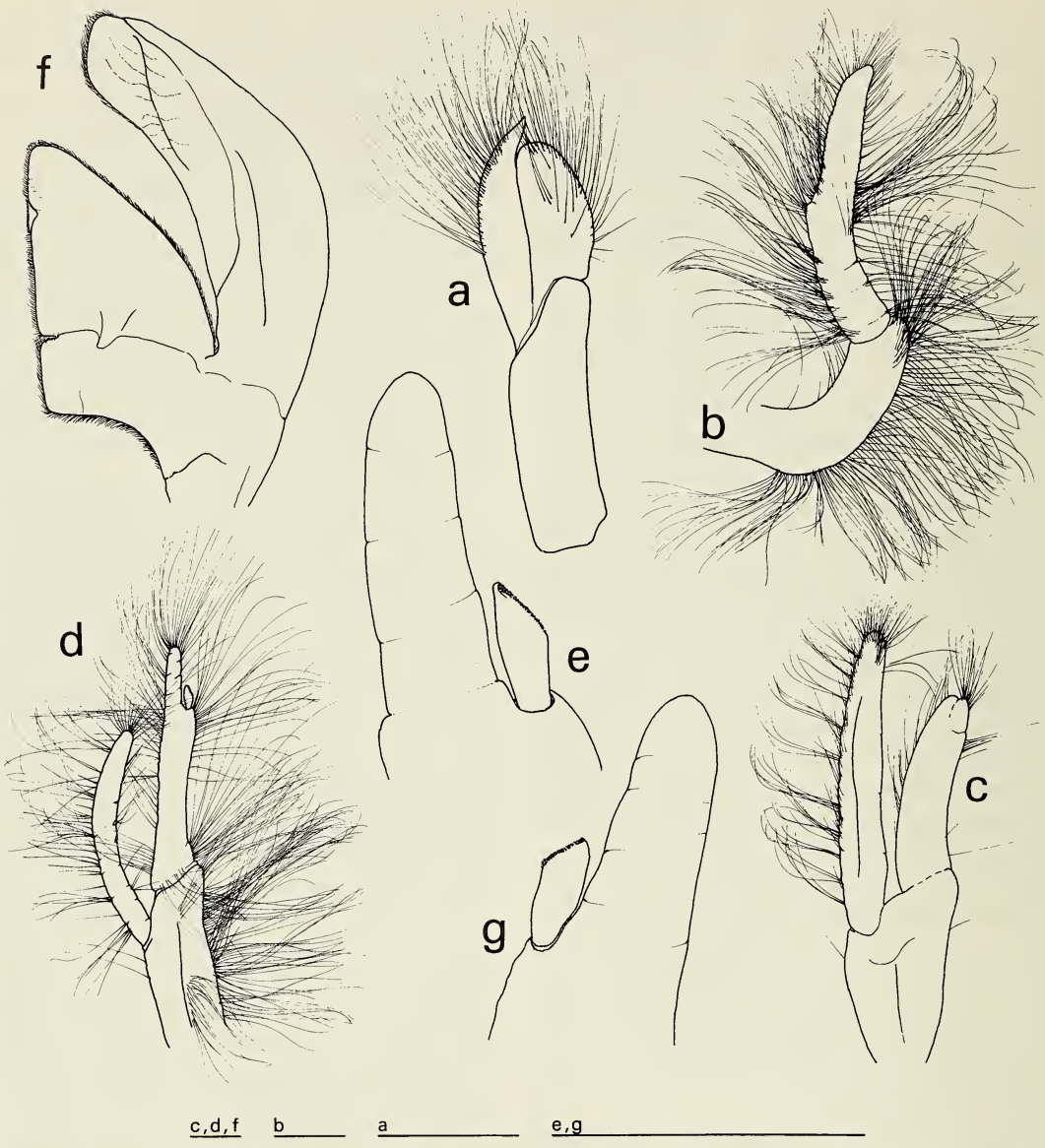

Fig. 4. *Sergio mericeae,* new species, type materials from Fort Pierce Inlet, Florida; a, c, f, male holotype (cl 29.8 mm), USNM 268645; b, d, e, female paratype (cl 26.5 mm), USLZ 3544. a, Right first pleopod of male, internal surface; b, Right first pleopod of female, lateral surface; c, Right second pleopod of male, posterior surface; d, Right second pleopod of female, posterior surface; e, Right second pleopod of female, distal endopod and appendix interna, posterior surface; f, Right third pleopod, anterior surface. *Sergio guassutinga* (Rodrigues) from Aracaju, Brazil, female (cl 23.5 mm), USNM 268644: g, Left second pleopod of female, distal endopod and appendix interna, posterior surface. Scale lines indicate 2 mm.

not have the burrow opening surrounded by a sand mound. Where mounds do occur, they are small, rarely exceed an elevation of 3–5 cm, and often are of muddier composition than the surface sand. Substrate cores extracted with yabby pumps in the more densely burrowed areas reveal relatively clean surface sands underlain by much muddier strata.

Etymology.—This species is named for

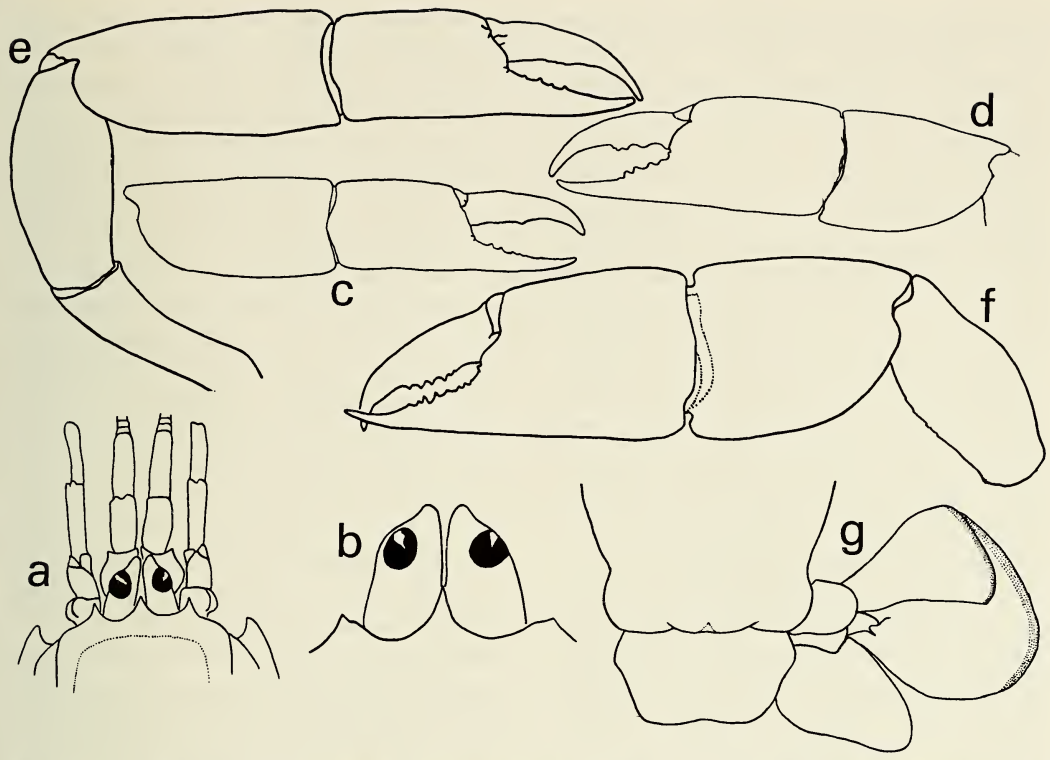

Fig. 5. *Sergio mericeae,* new species, juvenile paratypes from Fort Pierce Inlet, Florida, setae not shown; a, c, d, g, male (cl 8.3 mm), USNM 268694; b, male (cl 10.4 mm), USNM 268692; e, f, female (cl 10.6 mm), USNM 268645. a, Anterior carapace, eyestalks, antennal peduncles of immature male, dorsal view; b, front and eyestalks of immature male; c, Minor chela, internal surface, immature male; d, Major chela, internal surface, immature male; e, Minor chela, external surface, immature female; f, Major chela, external surface, immature female; g, Telson, right uropods, sixth abdominal segment, dorsal view, immature male. Not scaled.

our friend and colleague, Dr. Mary E. Rice, Director of the Smithsonian Marine Station– Link Port, Fort Pierce, Florida, in recognition of both her own substantial contributions in the field of marine invertebrate zoology and the generous assistance that she has provided to a large number of students, postdoctoral trainees, and fellow research scientists.

Remarks.—Like other species of the genus *Sergio, S. mericeae* can be distinguished from members of the closely related genus *Neocallichirus* on the basis of its relatively shorter and more angular, posteriorly emarginate telson and its narrower, more elongate uropodal endopods. In Florida, *S. mericeae* often occurs alongside *N. rathbunae, N. grandimanus,* and a third (yet to be described) *Neocallichirus* sp., all of which are also often reddish or pink in coloration. While mature and intact specimens of these species are readily distinguished from *S. mericeae* on the basis the major chela, all three of these *Neocallichirus* species also have broad, subquadrate uropodal endopods and a relatively long telson, the posterior margin of which is not notably emarginate but usually nearly straight or slightly convex in shape.

Distinction of *S. mericeae* from its southern equivalent, *S. guassutinga,* can in mature specimens be based upon several characters of the major cheliped. In *S. mericeae,* the merus of this appendage has a more rounded, less sharply defined longitudinal carina on the external surface and has a more

produced proximal prominence on the inferior margin. In *S. mericeae* this prominence is also offset by a short gap from the remaining dentition of the inferior margin, while in *S. guassutinga* the dentition is more or less equally spaced in the region just beyond the prominence, the potential gap being interrupted by one or more sizable teeth. Overall, the dentition of this inferior border in *S. mericeae* is also more ventrally directed than in *S. guassutinga,* where the marginal teeth in mature specimens are usually either lower or slightly more hooked and are thus directed more distally. The proximal end of superior margin of this article in mature specimens also often bears a more defined row of low tubercles in *S. mericeae* than in *S. guassutinga.*

In the larger mature specimens of *S. mericeae,* the carpus of the major chela is relatively shorter and of slightly different shape than in the largest *S. guassutinga* specimens we have seen; while in the Brazilian specimens of *S. guassutinga* carpal length was greater than ½ the palm length and was never less than $^{7}/_{10}$ of carpal height, in *S. mericeae* the carpal length was about half of the palm length and nearer $^{6}/_{10}$ of carpal height. Given this difference in dimensions, the arcuate inferior margin of this article in *S. mericeae* is shorter than in *S. guassutinga* and semicircular in shape.

The somewhat broader third maxilliped in *S. mericeae* may also serve to distinguish it from *S. guassutinga.* However, differences in specimen preservation can cause variable shrinkage in the soft internal tissues of this appendage, and caution must be used determining article dimensions. As folding and crenelation of the integument were conspicuous in most specimens of *S. guassutinga* available to us, we briefly soaked the third maxillipeds in water to reinflate them prior to determining dimensions. The length of the merus-ischium (measured as a single unit) is consistently subequal to 2 times its maximum width in *S. mericeae,* while it is at least 2.2 times its width in *S. guassutinga.* Similarly, the diagonal length of the ischium alone is 1.6 to 1.7 times its width in *S. mericeae,* while it consistently exceeds 1.8 times its width in *S. guassutinga.* On the internal surface of the ischium, an elevated row of spines (the *crista dentata*) on the internal surface of the ischium, which is moderately developed in *S. guassutinga,* is much less developed and difficult to discern over part of its length in *S. mericeae.* The propodus of the third maxilliped also differs in the two species, with the greatest height of this article occurring in its proximal third in *S. mericeae.* By contrast, greater development of the inferodistal lobe of the propodus in *S. guassutinga* usually produces a greatest height near its midlength.

Other characters may further serve to differentiate these species, although they cannot be clearly established with presently limited comparative materials. Shrinkage and distortion in preserved specimens of *S. guassutinga* preclude our making of very detailed and quantitative comparisons of eyestalks, nephridiopore sculpture, anterior pleopods and telson, despite some evidence of divergence in morphology of these features. While sculpture of the male gonopod is often of considerable value in separating of closely related species, and the terminal shape in *S. mericeae* appears to differ strikingly from that illustrated for *S. guassutinga* by Rodrigues (1971, fig. 56), our close examination of available males for the latter species reveals a very similar gonopodal structure to that we have illustrated for *S. mericeae* (Fig. 4a, c). In both species the posterior lobe may have a terminally acute tip varying in degree of development with maturity. While the terminal posterior and anterior lobes appear to be slightly more divergent in males of *S. guassutinga* than in mature males of *S. mericeae* that we examined, only one of two available males of the former species is a large fully mature specimen, and we cannot therefore account for the range of possible variation in that species.

The color in life of *S. mericeae,* with its bright red chelipeds and overall bright red color is different from that described by Rodrigues (1971: 207, 209) for *S. guassutinga,* with the females whitish and the males with a pink abdomen and pink-yellowish larger cheliped in the male.

In the Indian River Lagoon, Florida, *S. mericeae* is almost always taken along with scarlet red commensal polyclad worms, 4–7 mm in length. In some cases 8–12 or more of these commensals are taken with materials extracted from a single host burrow. These are either found moving over surfaces of the captured ghost shrimp or are seen when water and mud extracted from the burrow with the yabby pump are washed over a sieve. The occurrence of these commensals in such washings appears to be definitive evidence that the burrow contains *S. mericeae,* as thorough extraction from such burrows never yields other species of callianassids. While we remain uncertain of the generic assignment for this commensal, Rodrigues (1971) has also observed, in addition to clausidiid copepod and reddish nemertean commensals, occurrence of an undescribed reddish species of the polyclad genus *Stylochoplana* with *S. guassutinga.* In both Lake Worth, Florida, and the Rio Carrizal Estuary, Tamaulipas, Mexico, burrows of callianassids herewith assigned to *S. mericeae* may also host the pinnotherid crab, *Pinnixa cristata* Rathbun (see Manning & Felder 1989, Rabalais et al. 1989).

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